and goods. The challenges of the future, they say, "will offer almost unlimited opportunities for the kind of creative planning that will ensure an equitable balance between private rights and public needs, between competition in a free society and increasing political controls."

This promising start unfortunately is not effectively pursued. It is understandable that a book consisting of the reports of six different panels should be uneven. The reports on the technical aspects of air transportation give the impression that the compilers were comfortably sure of their ground; those on socioeconomic trends and government policy do not. There are compilations of data and projects but only vague conclusions of what they imply in terms of formulating policies. Detailed itemizing of government agencies and their functions takes up more space than it is worth. The composition of the workshop probably explains this deficiency. The technical side of aviation predominated, with some representation of economists, government officials, and management experts. But if public policy and socioeconomic trends were to be considered, should there not have been some sprinkling of political scientists, sociologists, psychologists—maybe even a historian or a philosopher?

The book definitely is not history of technology. It may, however, be a valuable document for the historian of a generation hence. It will let him compare the forecast with the actuality.

JOHN B. RAE*

The Beginnings of Satellite Communications. By J. R. Pierce, with an Introduction by Arthur C. Clarke. San Francisco: San Francisco Press, 1968. Pp. 61; Index; illustrations; drawings. $2.75.

This little volume, one of a series in the history of technology, is a cameo account of some of the early proposals for communications by satellite. Dr. John R. Pierce of the Bell Telephone Laboratories, who long had been interested in reporting on science and in writing science fiction, was asked in 1954 to address the Princeton, New Jersey, section of the Institute of Radio Engineers on "something concerning space." In his talk, reproduced intact in this volume, he spelled out at that early date some of the technical requirements and limitations of communications satellites.

In addition, the book includes a running account by Pierce of the early debate in the United States over which to build first—an active or a passive satellite; the subsequent development of the *Echo* passive satellite program and the *Telstar* active satellites. Pierce limits himself largely to his own personal observations and experience—his account is not meant to be comprehensive.

* DR. RAE, professor of history at Harvey Mudd College, is the author of *American Automobile Manufacturers, The American Automobile,* and the recently published *Climb to Greatness: The American Aircraft Industry, 1920–1960.*

Arthur C. Clarke, who wrote of communications satellites as early as 1945, contributes an Introduction, and in it gives additional early history of thought about satellites. His 1945 article also is reproduced in full.

RICHARD E. STOCKWELL*

A Heritage of Light: Lamp and Lighting in the Early Canadian Home. By Loris S. Russell. Toronto: University of Toronto Press, 1968. Pp. 344; notes; Glossary. $18.50 Canadian.

The author of this book, with a very good reputation based on a different scientific discipline, has come comparatively recently into the lighting field, first as a collector and now as a writer. It is therefore with pleasure that I find him taking the same scientific approach that was commented upon with surprise by many reviewers of my 1958 *Social History of Lighting*. Dr. Russell has actually tried out the lamps he describes, using fuels as near as possible to those contemporaneously available. He is also consistent in explaining the technologies involved.

There has been a great amount of repetitive nonsense written about lighting by those who have been less careful, and there has also been little recognition of its social importance. Trevelyan's renowned classic, *The Social History of England*, does not even mention the subject. Russell underlines its effects on the lives of the Canadian immigrants. Long, hard winters and short days are so much more bearable when lighting and heating are effective. The book is well researched, and well documented. The Index is good, and there is a Glossary. Footnotes are lumped together under chapter headings at the end, a practice I personally dislike although it make a neater looking production. The footnotes to the Introduction seem to have got lost on the way.

I could amplify, or disagree, with some of Russell's remarks, but this would give a wrong impression of a solid achievement. For instance, I am almost alone in questioning Edison's contribution to the manufacture of electric lamps. He did nothing original, and neither he nor Swan would have succeeded in making practical lamps had it not been for the Sprengel pump as modified by the technician working for Sir William Crookes. What Edison did do was to pioneer a remarkable distribution system and build the first power station for supplying the public generally. Even today there are features of the Pearl Street station in New York City that still appear in modern plants. Russell goes a long way toward agreeing with this view.

The pages of this book are unusual in being 9 inches square. The paper is exceptionally good and the illustrations profuse. There is no color. The layout is very pleasing, and the book handles well. It will

* MR. STOCKWELL, author of *Soviet Air Power* and former editor of *Aviation Age* magazine, is vice-president of the Commercial and Industrial Products Group of Avco Corporation.